**PATENT APPLICATION**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

FUJITA, MUNEHISA, et al.


Appln. No.: 08/915,683 Group Art Unit: 1752

Filed: August 21, 1997 Examiner: M. HUFF

For: DIRECT POSITIVE PHOTOGRAPHIC SILVER HALIDE EMULSION AND COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL COMPRISING SAME

**SUBMISSION OF APPELLANT'S BRIEF ON APPEAL**

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Submitted herewith please find an original and two copies of Appellant's Brief on Appeal. A check for the statutory fee of $300.00 is attached. Authorization is also given to charge or credit any difference or overpayment to Deposit Account No. 19-4880. A duplicate copy of this paper is attached.

Respectfully submitted,

Scott M. Daniels
Registration No. 32,562

SUGHRUE, MION, ZINN,
MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

Date: December 7, 1998

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#28
12.8.
12/14/98

In re Application of

**MUNEHISA FUJITA ET AL.**

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Examiner: M. Huff

For: **DIRECT POSITIVE PHOTOGRAPHIC SILVER HALIDE EMULSION AND COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL COMPRISING THE SAME**

## APPELLANTS' BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:



This is an Appeal from the final rejection of May 5, 1998, (Paper No. 21) of claims 1, and 5-9. A petition requesting a one-month extension of time is being filed herewith.

## REAL PARTY IN INTEREST

The real party in interest is the assignee, **FUJI PHOTO FILM CO., LTD.** of 210, Nakanuma, Minami Ashigara-shi, Kanagawa, Japan.

## RELATED APPEALS AND INTERFERENCES

There are no other related appeals or interferences known to Appellant, Appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending Appeal.

## STATUS OF CLAIMS

Claims 1, and 5-9 stand rejected under 35 U.S.C. §103 as being unpatentable over USPN 4,504,570 to Evans et al. ("Evans") in view of either USPN 5,081,009 to Tanemura et al. ("Tanemura") or USPN 5,110,719 to Shuto et al. ("Shuto"). Claims 2, 3, 4, and 10 have been cancelled. Claims 1, and 5-9 are presently being appealed.

## STATUS OF AMENDMENTS

In the Final Office Action dated May 5, 1998, the Examiner rejected claims 1, and 5-9 as being unpatentable over Evans in view of either Tanemura or Shuto. In response, Appellant submitted a Notice of Appeal and an Amendment both dated August 5, 1998 which conclusively demonstrated that claims 1 and 5-9 are patentable over the applied references. Subsequently, the Examiner issued an Advisory Action on August 18, 1998 and maintained that claims 1, and 5-9 are unpatentable over Evans, Tanemura and Shuto. Afterwards, Appellant filed a Request for Reconsideration on September 30, 1998 which showed that claims 1 and 5-9 would not have been obvious over the applied references. In response, the Examiner issued an Advisory Action on October 7, 1998, maintaining the prior art rejection of claims 1 and 5-9.

## SUMMARY OF THE INVENTION

The present invention relates to a composition for a direct positive photographic emulsion comprised of internal latent image type tabular silver halide grains, which form a direct positive image with excellent sharpness with reduced negative sensitivity at high illumination intensity. In conventional tabular grain emulsion formulations, formation of a re-reversed negative image frequently occurs when exposed to light at a high intensity (Page 3, lines 11-15). Tabular grain emulsions are also disadvantageous because of their instability during production (Page 4, lines 3-15).

In order to overcome the problem above, the present invention ensures that the tabular emulsion composition exhibits high sensitivity, reduced re-reversed negative image formation, and stability during production. In one embodiment, an emulsion composition with high sensitivity, reduced re-reversed negative image formation and production stability, is comprised of a tabular crystal grain[1] with a chemically sensitized[2] external shell and core further comprised of silver halide[3]. An illustrative embodiment of the external shell dimensions is shown in

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[1] Appellants have identified the range for the aspect ratio of the present invention. Aspect ratios of the tabular grain in excess of 100, result in deformation of the granule until application to a support. See page 20, lines 7-10.

[2] Chemical sensitization increases the photographic speed.

[3] The claimed embodiment is for silver bromide.

Fig. 1[4]. The aforementioned emulsion composition has more remarkable properties when a silver oxidizer is included in its formulation, more preferably a thiosulfonic compound[5] (Page 38, lines 6-8). See Table 4 at page 106, where comparison is made between the negative sensitivity and high sensitivity for emulsions comprised of different compositions. Most notably, the improved effects of the claimed thiosulfonic compounds on direct positive imaging, can be observed by comparing sample 202 with sample 205, and sample 203 with sample 206.

It is another aspect of the present invention, that the emulsions are prepared from seed crystals. Emulsions prepared from seed crystals are more stable during the production phase (page 4, lines 16-19; page 34, lines 6-13), but must be desalted before further processing, otherwise, the characteristics of the grains are susceptible to variation (e.g., changing thickness or aspect ratio; page 5, lines 6-10 and page 37, lines 11-15).

The present application also discloses a preferred average grain thickness[6] (page 20, lines 2-16), and grain distribution[7] (page 20, lines 17-19) for the tabular silver halide grains.

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[4] The average grain thickness a along the main plane of the external shell is not less than 0.2 μm and not more than 1.5 μm, and the average grain thickness b perpendicular to the main plane of the external shell is not less than 0.04 μm and not more than 0.30 μm.

[5] The claimed thiosulfonic compounds of the present invention are those represented by the formulas:

(A) $R\text{-}SO_2\text{-}S\text{-}M$

(B) $R\text{-}SO_2\text{-}S\text{-}R^1$

(C) $R\text{-}SO_2S\text{-}(L)_m\text{-}SSO_2\text{-}R^2$

[6] Grain thickness represents the distance between the main planes.

Appellants assert that these are ranges for the tabular silver halide grains of the claimed emulsion because they respectively confer greater stability on grains in an emulsion form before application to a support, and uniform dispersion or density of the grains throughout the emulsion.

Another embodiment of the present invention is a photographic light-sensitive material comprised of the aforementioned photographic tabular silver halide grain emulsion formula and a dye image-forming substance on a support. Those problems associated with direct positive image type tabular silver halide grains described above, also affect the color diffusion transfer properties of photographic light-sensitive materials. It is an object of the present invention to overcome those difficulties by producing a photographic light-sensitive material with the desired properties of the claimed composition for a tabular silver halide grain emulsion (Page 5, line 23-page 6, line 12).

The benefits claimed invention are demonstrated in Tables 6 & 7 on pages 119 and 120, respectively. For example, a color diffusion transfer light-sensitive material comprised of emulsion samples A3 and D3 prepared from core seed crystal emulsion containing one of the three thiosulfonic compounds achieved the desired effect of the present invention. Compare samples 341-360 and 381-400.

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[7] The coefficient of variation of thickness is not more than 30% for emulsions comprised of silver halide grains.

## ISSUES

Are claims 1 and 5-9 obvious under 35 U.S.C. §103(a) over Evans in view of either Tanemura or Shuto?

## GROUPING OF CLAIMS

Claims 1, and 5-9 do not all stand or fall together for purposes of the present appeal. In particular, claim 1 is separately patentable from claims 5-9, and claim 9 is separately patentable from claims 1 and 5-8. Furthermore, claims 5-8 stand or fall together and are separately patentable from claims 1 and 9.

## ARGUMENTS

**1. Rejection under 35 U.S.C. §103 over Evans in view of either Tanemura or Shuto.**

**A. Disclosure of Evans:**

The Evans composition relates to a high aspect ratio tabular grain internal latent image-forming emulsion for direct image formation with improved stability, decreased rereversed negative image formation, and enhanced sharpness. The core tabular emulsion is comprised of a silver halide, silver bromide and bromoiodide, preferably, which is chemically sensitized with sodium thiosulfate pentahydrate. Evans discloses that any surface chemical sensitzation as appropriate for latent-image silver halide emulsions, can be used to increase film speed. See column 21, lines 13-31. However, to achieve the object of the patented invention, the

composition is further sensitized by red spectral sensitization. The additional step of spectral sensitization confers improved developability (Example 1A) and room temperature storage of film (Example 1B).

Metal dopants are also incorporated into the tabular silver halide grains to decrease negative sensitivity upon exposure to intense illumination. See column 12, lines 32-35. By illustration, Example 3 reveals that a chemically (e.g., sodium thiosulfate pentahydrate) and spectrally (e.g., red) sensitized core/shell tabular AgBrI emulsion when doped with a heavy metal, produces a coating with the properties of improved reversal speed and reduced negative sensitivity.

Example 6 illustrates the case where the emulsion is applied to a material support such as a polyester film. Evans specifically discloses that silver halide emulsions chemically sensitized with thiosulfate pentahydrate and further spectrally sensitized, are more photosensitive and have higher speeds if the emulsion is spectral sensitized with a red compound than with a blue compound.

**B. Disclosure of Tanemura:**

The Tanemura composition relates to a direct positive photographic material comprised of a silver chlorobromide grain emulsion chemically sensitized with thiosulfonic compounds which provides a high-contrast positive image. See for example Table 4. Tanemura does not teach using thiosulfonic compounds for anything but improved direct positive imaging.

**C. Disclosure of Shuto:**

The Shuto composition relates to a direct positive photosensitive material comprised of a silver halide grain emulsion chemically sensitized with thiosulfonic compounds further comprised of thiosulfate ion, the combination of which provides high photosensitivity and high contrast direct positive imaging (Example 1), and improved long term storage of the material (Example 4). Shuto does not teach using thiosulfonic compounds and thiosulfate ions for anything but improved direct positive imaging and stability of the material.

**D. Analysis:**

Claims 1, and 5-9 have been rejected under 35 U.S.C. §103 as being unpatentable over Evans in view of either Tanemura or Shuto. Appellant respectfully submits that the Examiner's position is incorrect and that claims 1, and 5-9 would not have been obvious over the cited references.

**D1. Claim 1 would not have been obvious over Evans, Tanemura and Shuto because the references do not disclose or teach a tabular silver halide grain emulsion of the composition containing thiosulfonic compounds (A), (B) or (C), for direct positive imaging, reduced negative sensitivity, and production stability of granules.**

In the Amendment filed on August 5, 1998, Appellant distinguished claim 1 from Evans, Tanemura and Shuto by arguing that the octahedral silver halide emulsion disclosed in Tanemura

and Shuto does not produce the high illumination negative image with a direct positive image that is produced with tabular silver halide emulsion of the present invention. Tabular silver halide emulsions, which confer the direct positive image on film, were formulated to overcome the problem with a high illumination negative image by adding silver bromide to the core/shell emulsions. Silver bromide in the presence of the compounds represented by formulas (A), (B) or (C) of the present invention, produced a remarkably reduced high illumination negative image over the silver iodobromide emulsion of Evans. More specifically, the combined reference teachings do not suggest that sensitization of the silver bromide grains with the claimed thiosulfonic compounds alone would confer improved photographic characteristics of the present invention.

On pages 2 and 3 of the Office Action dated May 5, 1998, and in the Advisory Action of August 18, 1998, the Examiner alleged that the secondary references teach the use of the claimed thiosulfonic compounds in tabular grains, and the primary reference teaches the use of silver bromide cores.

In the Request for Reconsideration filed on September 30, 1998, Appellant argued that the combined art references would not result in the present silver halide emulsion disclosed in the present invention. The combination of Tanemura and Shuto, which teach the addition of thiosulfate ion and formulas (A), (B) or (C) to the chemical sensitization process, with the grain cores of Evans, would produce a composition distinguishable from the claimed invention. More specifically, the addition of thiosulfate ion is precluded in the claimed invention. However, in the

Advisory Action of October 7, 1998, the Examiner alleged that the use of thiosulfate ions for the sensitization steps of Tanemura, Shuto and Evans is optional. Rather, the formulas (e.g., (A), (B) or (C)) of the present invention alone, are sufficient for chemical sensitization, and the combined reference teachings would suggest the claimed formulation.

Appellant respectfully submits that the Examiner is misinterpreting and/or misapplying each of the references. For the following reasons, the rejection is respectfully traversed.

It is accepted by the courts that unexpected properties of a claimed chemical compound will rebut structural obviousness. As the CCPA said in In re Carlton (599 F.2d 1021 (CCPA 1979)), whether a property of a compound is to be expected based on the teachings of the prior art requires an actual analysis of the art itself. [8] Nothing in the combined references suggests that the thiosulfonic compounds in the emulsion composition of the present invention would chemically sensitize the claimed silver bromide grains, and achieve the results of diminished negative sensitivity, improved sharpness of direct image formation, and production stability of granules. Thus, Evans, Tanemura or Shuto cannot possibly teach or suggest that a different thiosulfonic compound-containing emulsion, as currently claimed, has improved photographic characteristics.

[8] *Id.* at 1026. "Although there is a vast amount of knowledge about general relationships in the chemical arts, chemistry is still largely empirical, and there is often great difficulty in predicting precisely how a given compound will behave."

Appellant's claimed tabular silver bromide emulsion invention falls within the holding of Carlton based on the unexpected and surprising demonstration that the claimed silver bromide and thiosulfonic compound emulsion formulation exhibits direct positive image formation and reduced negative sensitivity at high illumination intensity. See Table 3 as a comparative test in the Declaration filed March 4, 1998.

The Examiner's assertion that the presently claimed tabular silver bromide emulsion composition claims necessarily produce direct image formation, and reduced negative sensitivity under the Evans, Tanemura and Shuto patent disclosures is based on hindsight, and not on inference or direct proof. One could not reasonably conclude that the silver bromide emulsion composition has the properties of direct positive imaging or diminished negative sensitivity where there is inadequate support in the cited references to suggest either the presence or absence of similar photographic properties between the disclosed silver halide emulsion composition and that claimed by Appellant. The Examiner is improperly referring to the present specification for the suggestion to use thiosulfonic compounds in the absence of thiosulfate ion to chemically sensitize silver bromide grains in photographic emulsions. The Examiner is well aware that it is improper to use hindsight in a rejection. Appellant reminds the Examiner, that under the decision of In re Merck[9] , a conclusion of prima facia obviousness cannot be based on

[9] 800 F.2d 1091, 1097 (Fed. Cir. 1986).

structural similarity alone. The teachings of the prior art must provide a "sufficient basis for the required expectation of success, without resort to hindsight."

In summary, the Examiner's rejection is in direct conflict with the law concerning structural obviousness. Further, the Examiner's rejection is made with hindsight, which is legally impermissable. Finally, the references cited by the Examiner teach away from the Examiner's essential assumption, which is that one of ordinary skill in the art would readily use the claimed thiosulfonic compounds for chemical sensitization, improved direct positive imaging, reduced negative sensitivity, and increased stability of silver halide granules. Thus, Appellant respectfully submits that the rejections are obviated in view of the foregoing arguments.

**D2. Claims 5-8 are further patentable over Evans, Tanemura and Shuto because none of the references teaches or suggests the combination of chemically sensitizing the external shell with a thiosulfonic compound, preparing silver bromide grains from a seed crystal emulsion, using grains of the claimed external shell thickness, and uniformly dispersing the grains of the claimed thickness for an emulsion composition of the present invention.**

Appellant respectfully submits that the rejection of dependent claims 5-8 as obvious over the combined reference teachings has been obviated because Appellant has convincingly demonstrated that independent claim 1 is nonobvious over the cited reference combination.

**D3. Claim 9 is further patentable over Evans, Tanemura and Shuto because none of the references disclose or teach a color diffusion light-sensitive material comprised of the silver halide emulsion composition of the present invention much less one that includes a dye image-forming substance.**

A patentable distinction can be made between the presently claimed invention and the reference patents because none of the patents teaches or suggests the emulsion of the subject material, namely an emulsion comprised of tabular internal latent image type silver halide grains, the external shell of which is a silver halide phase formed on silver halide grains for forming an internal shell which grains have been chemically sensitized with thiosulfonic compounds and without thiosulfate ions in the process for the preparation of an emulsion, additionally comprised of a dye image-forming substance and applied to a support.

The photographic properties of the present claimed emulsion composition were not predictable from the knowledge of the prior art. Therefore, their use in color diffusion photography as applied to material supports could not have been taught or suggested.

Appellant respectfully submits that the rejection of claim 9 as obvious in view of the cited references be reconsidered and withdrawn.

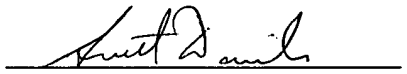
## SUMMARY

In view of the foregoing, Appellant respectfully submits that the claimed invention would not have been obvious over Evans, Tanemura and Shuto within the meaning of §103. Therefore,

reversal of the Examiner's position to the contrary is respectfully requested. Appellant further respectfully requests that the application be remanded to the Examiner with an instruction to withdraw the rejection under 103§ and pass the case to allowance.

Please charge any fee, except the Issue Fee, that may be necessary for the continued pendency of this application to our Deposit Account No. 19-4880.

Respectfully submitted,



Scott M. Daniels
Registration No. 32,562

SUGHRUE, MION, ZINN, MACPEAK
& SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3202
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

Attachment: Appendix of Claims

Date: December 7, 1998

## APPENDIX

CLAIMS 1, and 5-9 ON APPEAL:

1. An internal latent image direct positive photographic silver halide emulsion comprising tabular silver halide grains having an average grain diameter of not less than 0.3 μm and an aspect ratio of from not less than 2 to not more than 100 in an amount of not less than 50% of all silver halide grains as calculated in terms of area; wherein said tabular silver halide grains as calculated in terms of area; wherein said tabular silver halide grains are core/shell grains having a core and external shell, the average grain thickness a along the main plane of the external shell thereof is from not less than 0.2 μm to not more than 1.5 μm and the average grain thickness b perpendicular to the main plane of the external shell thereof is from not less than 0.04 μm to not more than 0.30 μm; and

wherein the core of said core/shell grains are composed of silver bromide and are subjected to chemical sensitization in the presence of at least one compound selected from the group consisting of compounds represented by the following formula (A), (B) and (C) and a gold sensitizer in combination under the condition that substantially no thiosulfate ion is present during the chemical sensitization:

$R\text{-}S0_2\text{-}S\text{-}M$ (A)

$R\text{-}S0_2\text{-}S\text{-}R_1$ (B)

$R\text{-}SO_2S\text{-}(L)_m\text{-}S\ S0_2\text{-}R_2$ (C)

wherein R, $R_1$ and $R_2$ may be the same or different and each represents an aliphatic group, aromatic group or heterocyclic group; M represents a cation; L represents a divalent linking group; m represents 0 or an integer of 1; the compounds of the formula (A), (B) and (C) may be each in the form of a polymer containing, as a repeating unit, a divalent group derived from the structures represented by the formulae (A), (B) and (C), respectively; and R, $R^1$, $R^2$ and L may be optionally connected to each other to form a ring.

5. The internal latent image directed positive photographic silver halide emulsion according to Claim 1, wherein the external shell has an external phase which is chemically sensitized in the presence of at least one compound selected from the group consisting of the compounds represented by the formula (A), (B) and (C).

6. The internal latent image type direct positive photographic silver halide emulsion according to Claim 1, which is prepared from a seed crystal emulsion which has been prepared via desalting process.

7. The internal latent image type direct positive photographic silver halide emulsion according to Claim 1, wherein the average grain thickness a along the main plane of the external shell thereof is form not less than 0.4 μm to not more than 1.0 μm and the average grain thickness b perependiclar to the main plane of the external shell thereof is from not less than 0.06 jam to not more than 0.15 μm.

8. The internal latent image type direct positive photographic silver halide emulsion according to Claim 1, wherein the thickness of grains are so uniform that the coefficient of variation of thickness is not more than 30%.

9. A color diffusion transfer photographic light-sensitive material comprising at least one photosensitive silver halide emulsion layer combined with a dye image-forming substance provided on a support, said dye image-forming substance comprising a nondiffusive compound represented by the following formula (I) which releases a diffusive dye or precursor thereof or changes in its diffusivity in connection with silver development;

wherein said at least one silver halide emulsion layer comprises at least one internal latent image type direct positive photographic silver halide emulsion comprising tabular silver halide grains having a core/shell structure with a core and an external shell, composed of silver bromide, and having an average grain diameter of not less than 0.3 μm and an aspect ratio of from not less than 2 to not more than 100 in an amount of not less than 50% of all silver halide grains as calculated in terms of area, with the average grain thickness a along the main plane of the external shell thereof being from not less than 0.2 μm to not more than 1.5 μm and the grain thickness b perpendicular to the main plane of the external shell thereof being from not less than 0.04 μm to not more than 0.30 μm; wherein grains are subjected to chemical sensitization in the presence of at least one compound selected from the group consisting of compounds represented by the following formula (A), (B) and (C):

$$R\text{-}SO_2\text{-}S\text{-}M \qquad (A)$$

$R\text{-}SO_2\text{-}S\text{-}R^1$ (B)

$RSO_2S(L)_mSSO_2R^2$ (C)

wherein R, $R^1$ and $R^2$ may be the same or different and each represents an aliphatic group, aromatic group or heterocyclic group; M represents a cation; L represents a divalent linking group; m represent 0 or an integer of 1; the compounds of the formula (A), (B) and (C) may be each in the form of polymer containing as a repeating unit a divalent group derived from the structure represented by the formulae (A), (B) and (C), respectively; and R, R', R2 and L may be optionally connected to each other to form a ring; and

wherein formula (I) is as follows:

$(DYE\text{-}Y)_n - Z$ (I)

wherein DYE represents a dye group or a dye group precursor group whose absorption wavelength has been shifted to short wavelength; Y represents a mere bond or bridging group; Z represents a group which makes a difference in the diffusivity of the compound represented by $(DYE\text{-}Y)_n - Z$ or releases DYE to make a difference in diffusivity between the release DYE and $(DYE\text{-}Y)_n - Z$ in correspondence or counter correspondence to a photosensitive silver salt having an imagewise latent image; and n represents an integer 1 or 2, with the proviso that when n is 2, the plurality of (DYE-Y)'s may be the same or different.